

CLAIMS

1. A lancing apparatus used for sampling a body fluid out of a skin by sticking an insertion element into the skin, the apparatus comprising a housing including a cylindrical portion brought into contact with the skin, and a negative pressure generator that generates a negative pressure inside the cylindrical portion to cause the skin to swell upward,

wherein the apparatus further comprises a detector that detects that the skin has been raised to a predetermined height inside the cylindrical portion.

2. The lancing apparatus according to claim 1, further comprising a controller that executes a control so as to maintain a pressure inside the cylindrical portion within a specific range, after the detector has detected that the skin has been raised to the predetermined height.

3. The lancing apparatus according to claim 2, further comprising a pressure detector that detects a pressure inside the cylindrical portion,

wherein the controller executes a control so as to maintain a pressure inside the cylindrical portion within a specific range, based on the pressure detected by the detector.

4. The lancing apparatus according to claim 2, wherein the specific range is defined by granting a specific tolerance to

a reference pressure; and

wherein the reference pressure is set at a lower value than the pressure inside the cylindrical portion at the time that the detector has detected that the skin has been raised
5 to the predetermined height.

5. The lancing apparatus according to claim 4, wherein the specific range has an upper limit and a lower limit which are set at a lower value than the pressure inside the cylindrical
10 portion at the time that the detector has detected that the skin has been raised to the predetermined height.

6. The lancing apparatus according to claim 2, wherein the detector is capable of detecting a fluctuation of the swelling
15 height of the skin, and

wherein the controller controls the pressure inside the cylindrical portion so as to maintain the swelling height of the skin at the predetermined level.

20 7. The lancing apparatus according to claim 6, wherein the detector includes a contacting member for contact with the skin when the skin has been raised to the predetermined height, so as to detect a contacting pressure of the skin applied to the contacting member.

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8. The lancing apparatus according to claim 7, wherein the controller controls the pressure inside the cylindrical

portion so as to maintain the contacting pressure within the specific range.

9. The lancing apparatus according to claim 2, wherein the
5 controller controls the operation of the negative pressure generator so as to maintain a pressure inside the cylindrical portion within the specific range.

10. The lancing apparatus according to claim 2, further
10 comprising a relief valve located at a position communicating with the inside of the cylindrical portion,

wherein the controller controls an opening and closing action of the relief valve so as to maintain the pressure inside the cylindrical portion within the specific range.

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11. The lancing apparatus according to claim 10, wherein the controller opens the relief valve when the pressure inside the cylindrical portion becomes equal or generally equal to a lower limit of the specific range.

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12. The lancing apparatus according to claim 2, further comprising a backup chamber into which a gas inside the cylindrical portion flows when the pressure inside the cylindrical portion becomes equal or generally equal to an
25 upper limit of the specific range, after generation of a negative pressure inside the cylindrical portion by the negative pressure generator.

13. The lancing apparatus according to claim 12, further comprising a gas supply selector controlled by the controller so as to select whether to supply a gas into the backup chamber.

5 14. The lancing apparatus according to claim 13, further comprising a cylindrical portion pressure detector that detects a pressure inside the cylindrical portion,

wherein the gas supply selector comprises a relief valve opened or closed according to a detecting result given by the
10 cylindrical portion pressure detector.

15. The lancing apparatus according to claim 12, wherein the backup chamber can be decompressed by the negative pressure generator.

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16. The lancing apparatus according to claim 15, further comprising a backup chamber pressure detector that detects a pressure inside the backup chamber,

wherein the negative pressure generator decompresses the
20 backup chamber when a pressure detected by the backup chamber pressure detector exceeds a predetermined threshold value.

17. The lancing apparatus according to claim 1, wherein the cylindrical portion includes an attachment base to which is
25 removably attached a sampling element that samples a body fluid coming out of the skin by the insertion of the insertion element.

18. The lancing apparatus according to claim 1, wherein the cylindrical portion of the housing includes a plurality of members, and one or more of the members are removable from another.

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19. The lancing apparatus according to claim 1, further comprising a controller that controls an insertion depth into the skin or an inserting speed of the inserting element, based on a pressure inside the cylindrical portion at the time that
10 the detector has detected that the skin has been raised to the predetermined height.

20. The lancing apparatus according to claim 1, wherein the negative pressure generator comprises an electric pump.